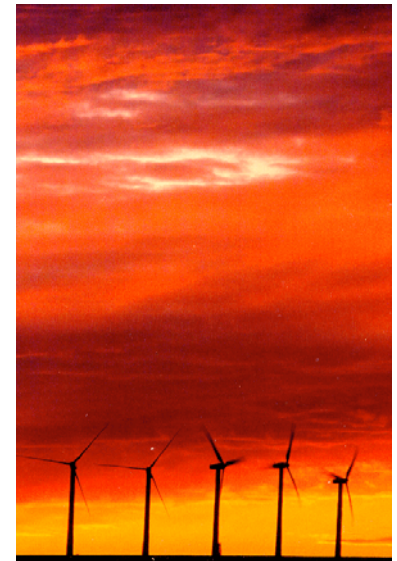


Opportunities for Avoiding, Minimizing, and Mitigating Wind Power Development Impacts on Wildlife

Dick Anderson
Guidelines Workshop
September 27-28, 2006
Bakersfield, California



Types of Mitigation

1. Avoid Impact and Minimize Impact (Pre and Post)
2. Reduce or Eliminate Impact overtime (Post)
3. Compensate for Impact (Pre and Post)
4. Adaptive Mitigation/Effectiveness Monitoring (Post)
5. Decommissioning (Post)

Wind Power Impacts

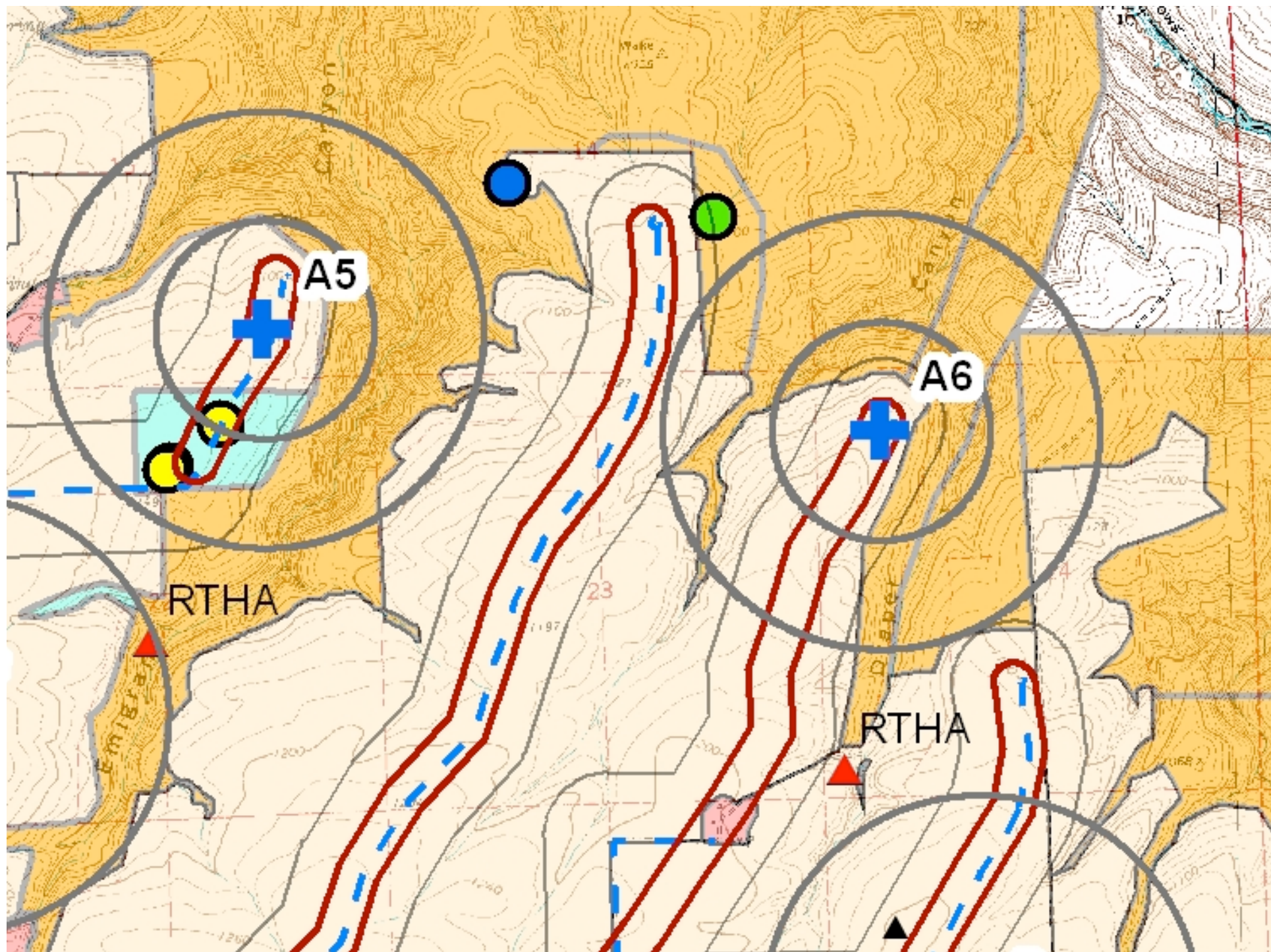
- Electrocution
- Habitat Loss
- Habitat Modification (Indirect Loss)
- Collisions
- Direct/Indirect
- Long-term/ Short-term
- Cumulative

Pre-permitting Important Time

- Pre-permitting is when impacts are estimated and mitigation is determined
- Important to make mitigation part of permit conditions
- Difficult to make substantive changes after construction

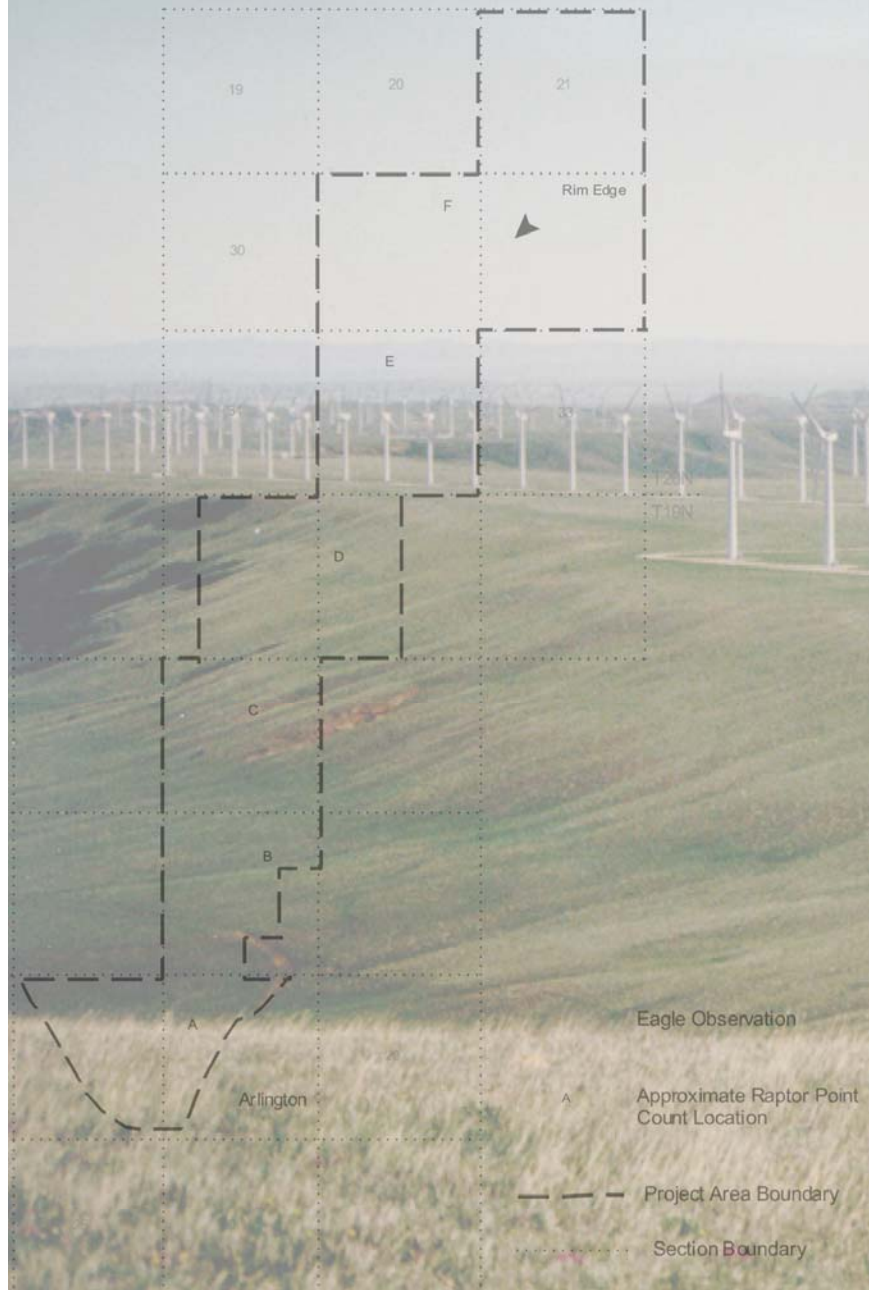
Avoid Impacts (Important)

- Macro Siting (Site Selection)(Very Important)
- Micro Siting
- Both require adequate information

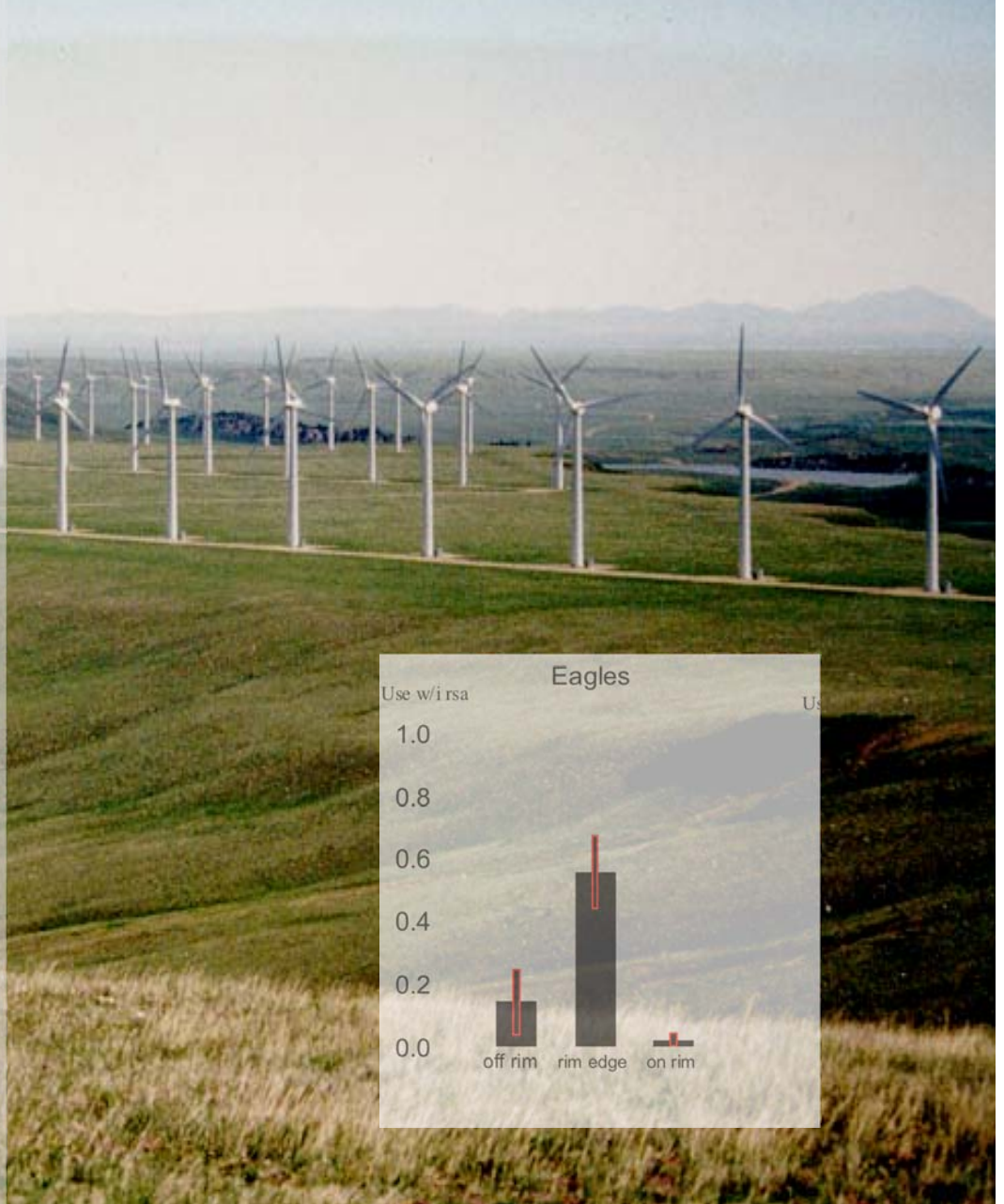


EAGLES

1999

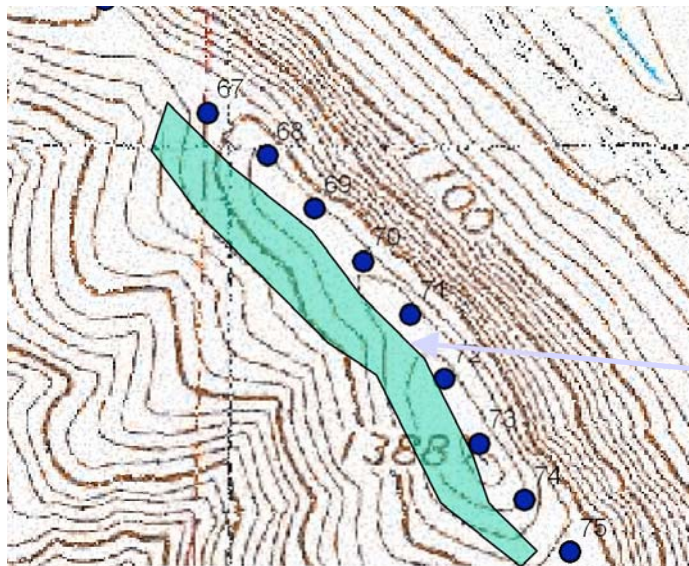
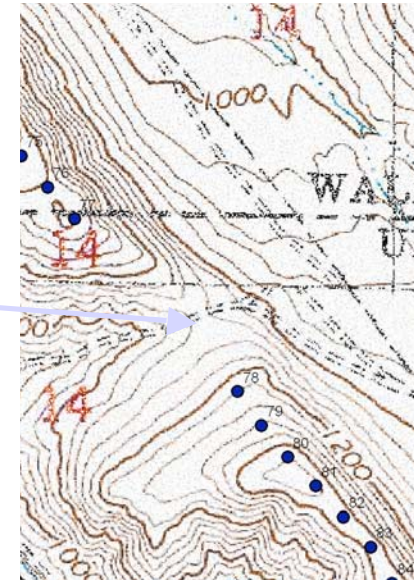
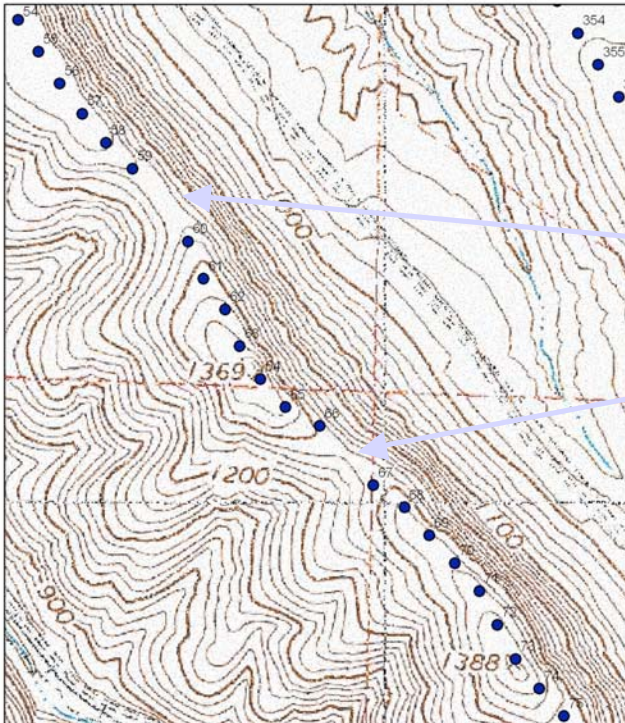


FOOTE CREEK RIM WYOMING



STATELINE WIND PROJECT

Avoid
Prominent
Saddles



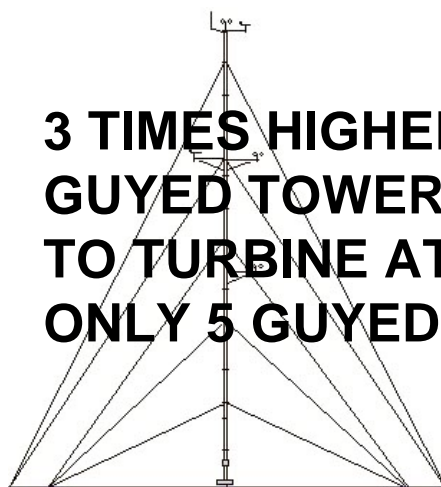
Avoided when feasible,
windward side of ridges

Minimize Impacts

- Limit degree of some action (i.e. road width)
- Micro siting
- Need adequate information
- Normal measures
 - Minimize habitat disturbance
 - Underground electrical lines
 - Erosion control

Met Towers

- Use of unguyed permanent met towers



**3 TIMES HIGHER MORTALITY AT
GUYED TOWER COMPARED
TO TURBINE AT FOOTE CREEK RIM
ONLY 5 GUYED TOWERS**



Gehring 2004 – guyed comm.
Tower 10 times higher mortality
than unguyed towers

Reduce or Eliminate Impact Overtime

- Adaptive mitigation
- Preservation, modification, and maintenance operations during life of project (remove wildlife attractions or enhance site for target species)
- Remove problem turbines - Altamont
- Shut down turbines seasonally - Altamont

Compensate for Impact

- Fee per turbine or MW, RSA, acre, annually or one-time, etc.
- WA Dept Fish and Wildlife Guidelines (Habitat replacement)
 - Permanent impacts
 - 2:1 shrub steppe
 - 1:1 grassland
 - Temporary impacts
 - 0.5:1 shrub steppe
 - 0.1:1 grassland
- Habitat conservation in-kind or out-of-kind
- Conservation easements/land purchase off-site
- Habitat enhancement off-site



Compensation Strategies

- Stakeholder Effort
- Fee (land conservation fee simple or easement, land management and maintenance)
- Handling funds
- Regional, statewide, or multi-state plan
- Conservation management
- Monitoring for effectiveness

Adaptive Mitigation/Effectiveness Monitoring

- Difficult to forecast impacts and effective remedies during permitting
- Research/Monitoring to determine impacts post-operation
- Remedies if needed
- Modifications as needed
- Continuing feedback as needed

Decommissioning

- Approved Plan submitted within several years of shut-down
- Remove structures or other agreed action
- Bond or Escrow account to insure funds are available for decommissioning

